

CLAIMS

1. A submount, comprising:
 - (a) a submount substrate; and
 - (b) a solder layer that:
 - 5 (b1) is formed on the top surface of the submount substrate; and
 - (b2) has a surface roughness, Ra, of at most $0.18\ \mu\text{m}$ before the solder layer is melted.
2. A submount as defined by claim 1, wherein the solder layer has a surface roughness, Ra, of at most $0.15\ \mu\text{m}$ before it is melted.
- 10 3. A submount as defined by claim 1, wherein the solder layer has a surface roughness, Ra, of at most $0.10\ \mu\text{m}$ before it is melted.
4. A submount as defined by any one of claims 1 to 3, wherein the solder in the solder layer has an average crystal-grain diameter of at most $3.5\ \mu\text{m}$ before it is melted.
- 15 5. A submount as defined by any one of claims 1 to 4, wherein the top surface of the submount substrate has a surface roughness, Ra, of at most $0.10\ \mu\text{m}$.
6. A submount as defined by any one of claims 1 to 5, the submount further comprising a solder-protecting barrier layer formed between the submount substrate and the solder layer.
- 20 7. A submount as defined by claim 6, the submount further comprising an electrode layer formed between the submount substrate and the solder-protecting barrier layer.
8. A submount as defined by claim 7, the submount further comprising be-

tween the submount substrate and the solder-protecting barrier layer:

(a) an intimate-contact layer formed such that it makes contact with the top surface of the submount substrate; and

(b) an element diffusion-preventing layer formed on the intimate-contact layer;

the electrode layer being placed on the element diffusion-preventing layer.

9. A submount as defined by claim 8, wherein:

(a) the intimate-contact layer comprises titanium;

(b) the element diffusion-preventing layer comprises platinum;

10 (c) the electrode layer comprises gold;

(d) the solder-protecting barrier layer comprises platinum; and

(e) the solder layer comprises gold-tin-based solder.

10. A submount as defined by any one of claims 1 to 9, wherein the submount substrate comprises an aluminum nitride-sintered body.

15 11. A semiconductor unit incorporating a submount as defined by any one of claims 1 to 10, the semiconductor unit being provided with a semiconductor light-emitting device mounted on the solder layer.